Claims

1. A barley lipoxygenase-1 mutant gene, wherein guanine at the splicing donor site (5'-GT-3') of the 5th intron of the barley lipoxygenase-1 gene is mutated to a different base.

2. A barley lipoxygenase-1 mutant gene according to claim 1, wherein the different base is adenine.

3. A selection method for barley lipoxygenase-1 deficient barley, comprising a step of distinguishing the barley lipoxygenase-1 deficient barley by whether or not the guanine at the splicing donor site of the 5th intron of the barley lipoxygenase-1 gene is mutated to a different base.

4. A selection method for barley lipoxygenase-1 deficient barley according to claim 3, wherein the different base is adenine.

5. A selection method for barley lipoxygenase-1 deficient barley according to claim 3 or 4, comprising

a genomic DNA extraction step wherein genomic DNA is extracted from a barley sample,

a DNA fragment amplification step wherein a DNA fragment containing the splicing donor site of the 5th intron of the barley lipoxygenase-1 gene is amplified from the extracted genomic DNA, and

a DNA fragment detection step wherein the DNA fragment containing the splicing donor site of the 5th intron of the barley lipoxygenase-1 gene amplified in the DNA fragment amplification step is cleaved with a restriction enzyme, a DNA fragment having the prescribed number of bases is detected, and the barley lipoxygenase-1

deficient barley is distinguished by whether or not the guanine at the splicing donor site is mutated to a different base.

6. A selection method for barley lipoxygenase-1 deficient barley according to claim 5, wherein the restriction enzyme used in the DNA fragment detection step is AfaI and/or RsaI which recognize the nucleotide sequence 5'-GTAC-3'.

7. A material for malt alcoholic beverages, wherein the material is selected from a group consisting of a seed, a malt, malt extract, barley decomposition product or processed barley derived from barley having a barley lipoxygenase-1 mutant gene according to claim 1 or 2.

8. A material for malt alcoholic beverages, wherein the material is selected from a group consisting of a seed, a malt, malt extract, barley decomposition product or processed barley derived from barley selected by a selection method according to any one of claims 3 to 6.

9. A method for production of malt alcoholic beverages characterized by using a material for malt alcoholic beverages according to claim 7 or 8.

10. A nucleic acid comprising the nucleotide sequence from position 1 to 1554 as set forth in SEQ ID NO: 10.

11. A nucleic acid comprising the nucleotide sequence as set forth in SEQ ID NO: 11.

12. A nucleic acid comprising the nucleotide sequence of 10 to 60 continuous bases including the 3178th base in the nucleotide sequence as set forth in SEQ ID NO: 11.

13. A method for detecting the presence of LOX-1 activity in barley, comprising

a step of isolating a genomic DNA from a barley sample, and

a step of detecting 3178th base of the nucleotide sequence as set forth in SEQ ID NO: 11, wherein the presence of the base is an indicator of the presence of LOX-1 activity in the barley.